Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of:	)	
	)	
Review of the Commission's Rules Governing the 896-901/935-940 MHz Band	)	WT Docket No. 17-200
	)	

To: The Commission

COMMENTS OF FIRSTENERGY CORP.

FirstEnergy Corp. ("FirstEnergy"), through its subsidiaries FELHC, Inc. and Jersey Central Power and Light ("JCP&L"), operates a licensed Private Land Mobile Radio ("LMR") system in the 900 MHz band that will be affected by the broadband (LTE) service allocation suggested by the Commission in its Notice of Proposed Rulemaking in the above-captioned proceeding.[1] FirstEnergy has severe reservations that this proposed operation will have a lasting harmful impact on the critical LMR system used by JCP&L to provide reliable electric power and especially to support emergency restoration services. The reliability of the JCP&L radio system is essential to the health, safety, and welfare of both JCP&L workers and New Jersey residents. The Commission is urged to carefully consider the impact of LTE technology to an adjacent LMR operation. These comments highlight FirstEnergy's concerns and propose mitigating factors for consideration.

I. BACKGROUND

FirstEnergy's 10 regulated distribution companies form one of the nation's largest investor-owned electric systems, serving 6 million customers in the Midwest and Mid-Atlantic regions. Stretching from the Ohio-Indiana border to the New Jersey shore, the

[1] *In re* Review of the Commission's Rules Governing the 896-901/935-940 MHz Band, *Notice of Proposed Rulemaking*, FCC 19-18, GN Docket 17-200 (*rel*. Mar. 14, 2019) ("NPRM").

companies operate a vast infrastructure of more than 269,000 miles of distribution lines and are dedicated to providing customers with safe, reliable and responsive service. FirstEnergy, through its subsidiary JCP&L, provides primary electric service to two major areas in New Jersey.

- **Northwest New Jersey** - This area of the State is very rural. Major storm events are commonplace and can result in transmission wires taken down by snow and ice, as well as resulting from fallen trees. Due to the sparse population between metropolitan areas, it is often time consuming to restore power to the critical services as well as the general population.

- **New Jersey Eastern Shore** - The Eastern shore of the state has a high population and summer influx due to vacationers seeking access to the Atlantic Ocean beaches. Coastal storms during the summer and the threat of hurricanes are constant issues of concern. After Superstorm Sandy, the Jersey shore was severely impacted and lost much of the power grid as well as natural gas service. The loss of both natural gas and electric service was particularly devastating as many first responders rely on backup generators running on natural gas.

In both of these geographic areas, JCP&L provides electric power to the general population, critical public safety industries including hospitals and transportation centers, as well as first responders such as police and fire stations. JCP&L depends on a robust LMR system to manage both the daily maintenance of the grid and emergency restoration efforts.

In the 2015-16 time frame, JCP&L made significant LMR upgrades to improve the reliability and operational function of its radio network. Through FirstEnergy's telecommunications consultant, JCP&L investigated available spectrum that may have been an alternative to using 900 MHz but due to the proximity of the New York Metropolitan area no alternative spectrum was available. As JCP&L was already licensed at 900 MHz, an upgrade of the existing network was the most rational approach. JCP&L continues to operate that upgraded network.

II. The Proposed 900 MHz Band Plan Will Cause Interference to LMR

FirstEnergy has very close relationships with public safety-first responder agencies and closely followed the issue in the 800 MHz band of public safety NPSPAC interference caused by Nextel and also by broadband operations on an adjacent block of spectrum. It appears to FirstEnergy that the issue of interference that caused public safety rebanding is ripe for discussion in connection with the current 900 MHz broadband proposal.

The interference to public safety 800 MHz systems was caused by two major factors -- out-of-band emissions and in-band receiver overload. Receiver overload is described as "Receiver Blocking" in the DVA Consulting Report included with PDV/EWA's October 2, 2017 comments in this docket, which also notes a potential for concern in the 900 MHz band.[2] Interference, which appears likely, would be in-band affecting the LMR subscriber unit receivers. These receivers are designed to pass the entire existing 935-940 MHz band. One benefit to this design is that wide subscriber receiver acceptance allows for relocating the LMR portion of the 900 MHz band into 1.5 and .5 MHz segments as proposed by the NPRM. However, the same receiver mechanism that permits receiver frequencies to be widely separated and located anywhere within the 900 MHz band, also causes subscriber units to receive and react to any strong broadband signal that would be present within the full 5 MHz of 935-940MHz spectrum. Reception of these strong signals has the effect of reducing the receiver processing of the desired narrowband frequency.

JCP&L's LMR system upgrade utilizes the latest and most advanced subscriber radio units available. Manufacturers have revised receiver designs to accommodate greater spectral acceptance. Older technology was limited to receive separation of less than 1 MHz, while

[2] EWA/PDV Comments (Oct. 2, 2017), Attachment 2, Page 24.

today's receivers can accept the entire design band. The frequency selectivity is contained in the downstage processing section of the receiver. The acceptance of the entire 900 MHz band by the receiver allows for a wide separation between assigned narrowband channels, with the drawback that the entire 900 MHz band is permitted into the very sensitive initial processing stage of the receiver. The spectral density shown by a broadband signal has the effect of reducing the sensitivity of the subscriber receiver to the desired narrowband frequency. In the broadband environment, unlike the existing narrowband operations, spectral density will be significantly increased as the rules permit power levels measured in Watts/MHz, where the broadband signal is spread over 3 MHz and the narrowband signal is spread over .0125 MHz. When operated in the proximity of strong signals in the band, the receiver may overload and not be able to receive on the selected frequency.

For this reason, the receiver in the JCP&L subscriber units will pass signal in the entire 900 MHz band without attenuation. Even when the operating frequency is moved into the new LMR portion of the band, the receiver is subject to high spectral density signals from non-co-channel broadband LTE operations.

The Commission is urged to consider the impact upon 900 MHz LMR operation from in-band operation of broadband LTE. This is likely to result in the same interference mechanism that was seen with public safety licensees in NPSPAC. The Commission's concern about adjacent service protection is well-founded and did result in moving the broadband segment from the 900 MHz band edge; however, this interference concern still exists with the relocated narrowband LMR system remaining at 900 MHz.

III. The Commission Should Modify the Proposed 900 MHz Band Plan

The Commission should modify the proposed 900 MHz band plan as described below to protect incumbent licensees from an unnecessarily volatile interference environment.

Currently the fixed portion of the 900 MHz band transmits at 935-940 MHz with subscribers transmitting at 896-901 MHz. The Commission proposes to mirror this pairing in the 900 MHz broadband allocation. This results in the following band plan.

(NPRM Proposed Band Plan)

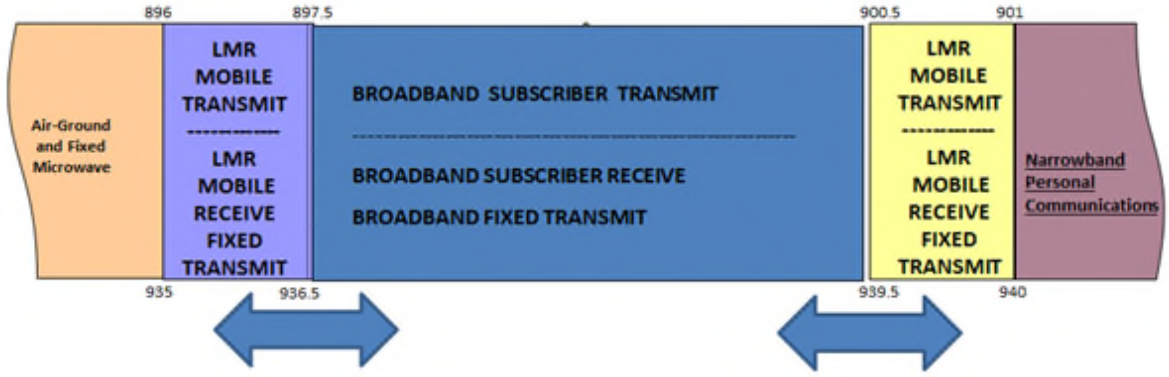

Figure 1

This proposed band plan exposes LMR subscriber receivers to interference from broadband fixed transmitters operating within the LMR service area. As shown by the arrows, LMR subscribers in areas where a strong broadband signal is present will have a strong wideband signal present at the receiver antenna. This signal emanating from the broadband fixed transmitters will swamp the LMR receiver and cause degradation to the ability to receive on the selected LMR frequency. This is true even if the LMR subscriber is not spectrally adjacent to the broadband fixed transmitter due to the bandpass issue described above.

The same interference issue would be present to the broadband receiver operating in the vicinity of a narrowband LMR transmitter. Co-channel mileage separations (unless

applied throughout the entire 935-940 MHz band) have no relationship to the interference possibility, as the interference is not a co-channel situation, but an in-band receiver blocking from an adjacent broadband operation. However, due to the narrow bandwidth of the 12.5 kHz LMR transmitter, the interference would be significantly masked by the much wider broadband signal. In the ideal world, there would be at least a 500 kHz guard band between the broadband and the narrowband signals of the band, and the narrowband receiver acceptability would be redesigned to block signal from the broadband segment. Such a change is not practical with the current installed base of 900 MHz band *LMR* subscribers.

However, because there is no current installed fixed equipment or active subscribers for the *broadband* segment, the Commission can proactively address the issue by allocating the fixed broadband transmit to the 896-901 MHz portion of the band and broadband subscribers to the 935-940 MHz portion as shown in the table below.

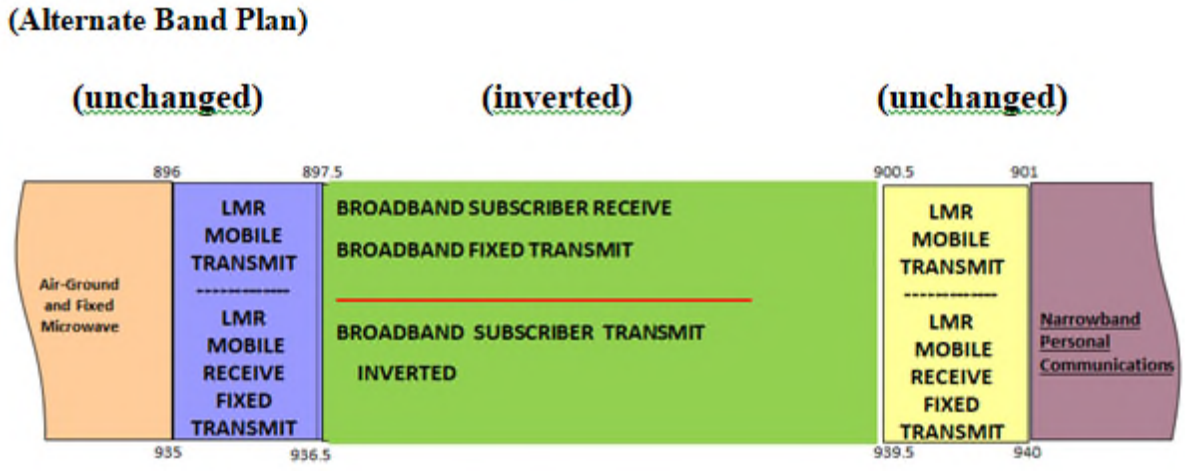

Figure 2

FirstEnergy's alternative band plan mitigates possible interference to subscriber receivers and moves that possible interference to fixed receivers on both the LMR and broadband segments. At fixed locations it is possible to remedy interference through the use

of receiver filtering, an option not possible in mobile subscriber receivers. The revised band plan benefits both LMR and broadband operations by moving interference possibility from numerous mobile subscriber units to a lesser number of fixed receivers where it is technically feasible to install filtering that can selectively pass or notch the offending frequency.

The mechanism for interference is only perceived at receivers. Evaluating the various receivers in an LMR/LTE environment shows the following.

- **LMR subscriber receiver:** Receiving signal from the LMR fixed infrastructure in the 935-940 MHz segment of the band, these receivers would only be subject to possible interference from LTE subscriber transmitters. Since both are iterant in nature, if any interference were produced it would be temporary and at undefined locations.

- **LTE subscriber receiver**: Receiving signal from the fixed LTE infrastructure in the 896-901 MHz segment of the band, these receivers would only be subject to possible interference from LMR subscriber transmitters. Since both are iterant in nature, if any interference was produced it would be temporary and at undefined locations.

- **LMR fixed receiver:** LMR stations receiving a signal from subscribers in the 896-901 MHz segment of the band would be subject to high spectral density overload from LTE systems transmitting in an adjacent segment of the band. However at a fixed location it is possible to employ receiver filtering to provide a level of foreign signal reject that is currently missing in the receiver design. A selective pass filter would reject in-band noise and broadband signals. Since both the LMR fixed receiver and the LTE fixed transmitter are stationary, any solution would not be subject to varying geographic considerations.

- **LTE fixed receiver:** LTE stations receiving a signal from subscribers in the 935-940 MHz segment of the band would be subject to signals from LMR systems transmitting in the adjacent segment of the band. Similar to the LMR fixed receiver, at fixed locations it is possible to employ receiver filtering to provide a level of foreign signal rejection. The use of notch filtering on the specific LMR channels causing interference would resolve the issue. Further since both the LTE fixed receiver and the LMR fixed transmitter are stationary, any solution would not be subject to varying geographic considerations.

FirstEnergy appreciates that its proposal deviates from the 3GPP standard, which designates the 896-901 portion of the band as uplink and the 935-940 MHz portion of the band as downlink. However, as the Commission acknowledges, a 3/3 MHz broadband service is unlikely to be used for nationwide commercial offerings. It is much more likely to

be deployed in built-to-suit systems to which a minor deviation to the 3GPP standard will have little-to-no impact. For example, international roaming will be non-existent. And large enterprise users are well-accustomed to proprietary radio technology. A small change to the standard will not be a significant market deterrent, as it may be for consumer devices. The benefits to incumbent critical infrastructure systems of modifying the band plan outweigh any potential detriment.

IV. OTHER QUESTIONS POSED IN THE NPRM

A. *The Broadband Licensee Must Pay All Incumbent Relocation Costs*

The cost for relocation of LMR systems must be borne entirely by the broadband licensee.[3] In particular, the cost for existing equipment re-tuning would not be a major concern. The relocation to the new band segments is within the current equipment specification. However, there are extenuating costs involved with the fixed site installations. Compressing the 900 MHz band into two segments of 1.5/1.5 and .5/.5 MHz will result in closer separation between allotted channels in a multi-channel configuration. This can require replacement of combiners at fixed sites.

In addition, the compacting of LMR eligible spectrum will also affect the fixed station antenna system by reducing separation between assigned channels, creating the need for additional fixed antennas. The antenna issue is problematic in that leased sites will increase rental fees and additional antennas will increase supporting structure wind and ice loading. Some of the FirstEnergy sites are leased and have antenna restrictions. Additional antennas may not be possible or may increase the ongoing lease cost. All of these factors must be considered before any realistic estimate of the impact of relocation can be made,

[3] NPRM at para 50.

however, the actual additional expense will not be known until the channel configuration is proposed for a fixed site.

B. Incumbent Relocation Must be a Fully Voluntary Market-Based Process

In the NPRM, the Commission proposes a market-based, voluntary relocation process to move incumbents from the broadband portion of the 900 MHz band. Large incumbent LMR system operators are the likely end users of any broadband 900 MHz systems. The Commission states in the NPRM that, "3/3 MHz is less than what the Commission has designated for other flexible-use broadband services in the past."[4] The Commission further states that a 3/3 MHz link would have "relatively limited capacity and speed" compared to 4G networks, but may be suitable for enterprise operations.[5] In cases in which such operators do not believe applications available through the 900 MHz broadband network are beneficial, they should not be forced to undergo mandatory relocation. Those operators that seek to use the 900 MHz broadband network will be incentivized to relocate their incumbent systems. Many areas of the county have little or no 900 MHz incumbent use and a 900 MHz broadband service may become available in the near term. The level of success of such a service would serve to influence the market-driven relocations in more congested areas.

FirstEnergy has explained above that the 900 MHz broadband allocation has a high potential to impact mission critical incumbent LMR systems. In addition, the relocation of utility LMR systems is disruptive to utility operations. In light of this, FirstEnergy strongly believes voluntary relocation is the only acceptable method of relocating incumbents.

[4] NPRM at 5.
[5] *Id.*

V. CONCLUSION

FirstEnergy is concerned that the operating system of its critical infrastructure subsidiary JCP&L will be severely impacted with the adoption of a broadband option at 900 MHz and that such a change could trigger another instance of severe harmful interference such as was caused to the Public Safety NPSPAC band at 800 MHz. FirstEnergy has proposed a possible method to mitigate the interference by reversing the fixed and mobile segment of the proposed broadband operation. Since this is a new technology, making this change now when there is no in-place equipment is prudent. Further, since the Commission proposes to locate the broadband segment such that LMR will occupy both sides of the broadband segment, this change would not affect any of the services adjacent to the 900 MHz band.

The Commission is urged to carefully consider that disruption to critical infrastructure during the maintenance and emergency repair of vital services is not in the public interest. FirstEnergy must maintain vital communications to properly protect life and property within its operating area.

Respectfully submitted,

/s/

Greg Kunkle
Keller and Heckman LLP
1001 G Street, NW, Suite 500 West
Washington, DC 20001
202.434.4178
kunkle@khlaw.com
Counsel to FirstEnergy Corp.

Dated: May 31, 2019